BANGLADESH TECHNICAL EDUCATION BOARD

4-YEAR DIPLOMA-IN-ENGINEERING PROGRAM

Computer Technology

SYLLABUS
SEVENTH AND EIGHTH SEMESTER

Computer Technology

Seventh Semester

SL	Course Code	Course Title	T	P	C
1	2677	Industrial Training	-	-	6

EIGHTH SEMESTER

Sl. No	Subject code	Name of the subject	T	P	C	MARKS				
						Theory		Practical		Total
						Cont. assess.	Final exam.	Cont. assess.	Final exam.	
1.	2691	Embedded System and PLC	2	6	4	50	50	60	40	200
2.	2692	Java Programming	2	3	3	50	50	30	20	150
3.	2693	System Analysis, Design & Development	2	3	3	50	50	30	20	150
4.	2694	Data Communication & Computer Network-II	2	3	3	50	50	30	20	150
5.	4586	Multimedia And Graphics	2	3	3	50	50	30	20	150
6.	2696	Computer Servicing - II	0	3	1	-	-	30	20	50
7.	2684	Computer Engineering Project-II	0	3	1	-	-	30	20	50
8.	1581	Entrepreneurship	2	0	2	50	50	-	-	100
9.	1582	Industrial Management-II	2	0	2	50	50	-	-	100
			14	**24**	**22**	**350**	**350**	**240**	**160**	**1100**

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SEVENTH SEMESTER

	Subject Code		T	P	C
	2677	**Industrial Training**	**-**	**-**	**6**

EIGHTH SEMESTER

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4-YEAR DIPLOMA-IN-ENGINEERING PROGRAM

COMPUTER TECHNOLOGY

SYLLABUS

EIGHT SEMESTER

2691 Embedded systems & PLC

T	P	C
2	6	4

AIMS

- To develop knowledge and skill on programming and interfacing to embedded systems using Micro controller.
- To develop knowledge and skill on PLC programming, interfacing and communication.

SHORT DESCRIPTION

The microcontroller features, architecture, instructions, addressing modes, programming, serial communication, interrupts programming and the real world interfacing. Programmable logic controller and interfacing; PLC programming; PLC and Industrial control systems.

DETAIL DESCRIPTION

THEORY:

1 Understand the basic of microcontroller

1.1 Define embedded system and microcontroller
1.2 Describe the basic building blocks of a microcontroller
1.3 Describe the history and development of microcontroller.
1.4 Distinguish microcontroller and microprocessor
1.5 List different manufacturer of microcontroller
1.6 State the characteristics different family of microcontroller
1.7 State criteria for choosing a microcontroller
1.8 Describe the concept of In Circuit Serial Programming

2 Understand the feature of the PIC microcontroller

2.1 List the feature of the PIC microcontroller
2.2 Describe the architecture of mid-range PIC microcontroller
2.3 Describe the SFR (Special Function Register) of PIC16X84 microcontroller
2.4 Describe the memory organization of the PIC 16F84A
2.5 Describe the pins and signals of PIC16F84A
2.6 Describe the clock/oscillator system in PIC16F84A

3. Understand the feature of CPU and peripheral associate register

3.1 Describe the structure and function of STATUS register
3.2 Describe the structure and function of INTCON register
3.3 Describe the structure and function of OOTION_REG register (specially TMR0 associate register)
3.4 Describe the structure and function of data EEPROM memory associate register (EECON1 and EECON2)
3.5 State the feature of stack in PIC 16F84A microcontroller
3.6 State the feature of GPR (General Purpose Register) in PIC16F84A

4. Understand programming of the PIC16F84A microcontroller

4.1 Mention the types of instruction in mid-range PIC microcontroller
4.2 Describe the syntax, operation and description of each instruction in mid-range PIC microcontroller
4.3 Describe the structure of assembly language program
4.4 Define software development tools and IDE
4.5 List some software development tools and IDE for PIC microcontroller
4.6 Explain the assembler directives
4.7 Mention the steps to create an executable program
4.8 Name the files in PLC assembly language program.
4.9 State the purpose of the files used in PIC assembly language programming tools (MPLAB, PMASM or any third party development tools)

5 Understand the concept of I/O ports and timer modules.

5.1 Name the I/O ports of PIC16F84A and their corresponding data direction register.
5.2 Describe the function of I/O ports of PIC16F84A and their corresponding data direction register.
5.3 State the codes for initializing I/O ports.
5.4 State the general features of Timer0 module.
5.5 Describe the functions and operation of PIC16F84A Timer0 module.
5.6 State the function of prescaler.

6. Understand the special features of PIC16F84A **CPU.**

6.1 Name the special features of PIC16F84A.
6.2 State the function of each bits of PIC16F84A configuration word.
6.3 State the oscillator type/mode uses with PIC16F84A.
6.4 State the crystal oscillator configuration of a PIC16F84A.
6.5 State the types of Reset used in PIC16F84A
6.6 Describe the concept of Power On Reset(POR),Power Up Timer(PWRT) and Oscillator Start Up Timer(OST)
6.7 State the function of Time Out Sequence and Power Down Status bits (TO/PD) of PIC16F84A.
6.8 State the function of each interrupts sources used in PIC16F84A.
6.9 Describe the operation of Watchdog Timer in PIC16F84A.
6.10 State the function of Power down Mode (Sleep and Wake up from sleep) in PIC16F84A.

7. Understand the functions of PLC

7.1 Define PLC
7.2 State the purpose of PLC
7.3 State the historical development of PLC
7.4 Describe the functional block diagram of a PLC system
7.5 Describe the architecture of a PLC.
7.6 Distinguish between fixed PLC and modular PLC
7.7 Mention the name and symbol of input and output devices used with PLC system.
7.8 State the uses of multi bit and single bit memory of PLC system.

8. Understand the addressing and programming technique of PLC

8.1 State the technique of input/output addressing of PLC program.
8.2 Mention the way of internal relay and data resistor addressing in PLC Program.
8.3 State the way of timer and counter addressing in PLC program.
8.4 State the meaning of scan time
8.5 Mention the influencing factors of scan time
8.6 Describe different types of PLC programming with example.

9. Understand PLC instructions and program with ladder diagram.

9.1 Define rail and rung.
9.2 Mention the name and symbol of Relay type instructions.
9.3 Mention the point to be considered for developing PLC program.
9.4 Prepare sample program using Relay type instructions.
9.5 Develop simple program using timer and counter instructions.
9.6 Develop simple program using word comparing and arithmetic instructions.

10. **Understand PLC system maintenance and trouble shooting.**

10.1. State the general, input and output specification of a PLC system.
10.2. State the software requirements of a PLC system.
10.3. Describe the features of SCADA.
10.4 State the rules of PLC installation.
10.5 State the meaning of commissioning and their stages.
10.6 State the general procedure of trouble shooting and repairing PLC.

Practical:
Microcontroller

1 Perform the tasks to design and develop a microcontroller based system for flashing LEDs.

1.1 Design the schematic and component layout diagram of the system.

1.2 Construct the interface of the diagram.

1.3 Draw the flow chart of the program.

1.4 Code the program using an appropriate microcontroller based software (MPLAB).

1.5 Store the program into a permanent memory (EEPROM).

1.6 Connect the interface circuit with the microcontroller system.

1.7 Run/simulate the program to demonstrate the result.

1.8 Prepare a report for the developed system.

2 Perform the tasks to design and develop a microcontroller based system for running LED lights.

2.1 Design the schematic and component layout diagram of the system.

2.2 Construct the interface of the diagram.

2.3 Draw the flow chart of the program.

2.4 Code the program using an appropriate microcontroller based software (MPLAB).

2.5 Store the program into a permanent memory (EEPROM).

2.6 Connect the interface circuit with the microcontroller system.

2.7 Run/simulate the program to demonstrate the result.

2.8 Prepare a report for the developed system.

3 Perform the tasks to design and develop a microcontroller roller based system for generating timing pulses (triangular wave or square wave).

3.1 Design the schematic and component layout diagram of the proposed system.

3.2 Construct the interface of the proposed diagram.

3.3 Draw the flow chart of the program.

3.4 Code the program using an appropriate microcontroller based software (MPLAB).

3.5 Store the program into a permanent memory (EEPROM).

3.6 Connect the interface circuit with the microcontroller system.

3.7 Run/simulate the program to demonstrate the result.

3.8 Prepare a report for the developed system.

4 Perform the tasks to design and development a microntroller based system to control the switching operation of an inverter (power supply backup system).

4.1 Design the schematic and component layout diagram of the system.

4.2 Construct the interface of the diagram.

4.3 Draw the flow chart of the program.

4.4 Code the program using an appropriate microcontroller based software (MPLAB).

4.5 Store the program into a permanent memory (EEPROM).

4.6 Connect the interface circuit with the microcontroller system.

4.7 Run/simulate the program to demonstrate the result.

4.8 Prepare a report for the developed system.

5 Perform the tasks to design and develop a microcontroller based system for displaying hexadecimal digit using specific device address, Decoder, NAND & NOR gate and a common anode seven segment display.

5.1 Design the circuit diagram for the task/job.
5.2 Construct the interface circuit according to the diagram.
5.3 Configure the ports for input/output operation.
5.4 Draw the flow chart of the program for solving the above problem.
5.5 Code the program in assembly language using a standard assembler/assembly language kits.
5.6 Store the program into an appropriate EEPROM.
5.7 Connect the interface circuit to a microcontroller system.
5.8 Run the program and demonstrate the result.
5.9 Prepare detail report for the developed system.

6 Perform the tasks to design and develop a microcontroller based system for shifting and changing characters in a LED Matrix display.

6.1 Design the schematic and component layout diagram of the system.
6.2 Construct the interface circuit according to the diagram.
6.3 Configure the ports for input/output operation.
6.4 Draw the flowchart of the program for performing the above tasks.
6.5 Save the program into an appropriate permanent memory (EEPROM).
6.6 Connect/install the interface circuit to the microcontroller system.
6.7 Run/simulate the program to demonstrate the output result.
6.8 Prepare a report for the developed system.

7 Perform the tasks to design and develop a microcontroller based optoisolator interface system between an external signal and an electronic device/system for the safe operation of the device/system.

7.1 Design the schematic and component layout diagram of the system.
7.2 Construct the interface circuit according to the diagram.
7.3 Configure the ports for input/output operation.
7.4 Draw the flowchart of the program for performing the above tasks.
7.5 Save the program into an appropriate permanent memory (EEPROM).
7.6 Connect/install the interface circuit to the microcontroller system.
7.7 Run/simulate the program to demonstrate the output result.
7.8 Prepare a report for the developed system.

8 Perform the tasks to design and develop a microcontroller based relay interface control system where absolute electrical isolation between the system and external contacts is required for the safe operation of the system.

8.1 Design the schematic and component layout diagram of the system.
8.2 Construct the interface circuit according to the diagram.
8.3 Configure the ports for input/output operation.
8.4 Draw the flowchart of the program for performing the tasks.
8.5 Save the program into an appropriate permanent memory (EEPROM).
8.6 Connect/install the interface circuit to the microcontroller system.
8.7 Run/simulate the program to demonstrate the output result.
8.8 Prepare a report for the developed system.

9 Perform the tasks to design and develop a microcontroller based interface system to control the speed and direction of a stepper motor.

9.1 Design the schematic and component layout diagram of the system.

9.2 Construct the interface circuit according to the diagram.

9.3 Configure the ports for input/output operation.

9.4 Draw the flowchart of the program for performing the above tasks.

9.5 Save the program into an appropriate permanent memory (EEPROM).

9.6 Connect/install the interface circuit to the microcontroller system.

9.7 Run/simulate the program to demonstrate the output result.

9.8 Prepare a report for the developed system.

10 Perform the tasks to design and develop a microcontroller based system to control the starting, stopping, direction and rotation speed of a DC motor.

10.1 Design the schematic and component layout diagram of the system.

10.2 Construct the interface circuit according to the diagram.

10.3 Configure the ports for input/output operation.

10.4 Draw the flowchart of the program for performing the above tasks.

10.5 Save the program into an appropriate permanent memory (EEPROM).

10.6 Connect/install the interface circuit to the microcontroller system.

10.7 Run/simulate the program to demonstrate the output result.

10.8 Prepare a report for the developed system.

11 Perform the tasks to design and develop a microcontroller based digital to analog conversion (DAC) interface system.

11.1 Design the schematic and component layout diagram of the system.

11.2 Construct the interface circuit according to the diagram.

11.3 Configure the ports for input/output operation.

11.4 Draw the flowchart of the program for performing the above tasks.

11.5 Save the program into an appropriate permanent memory (EEPROM).

11.6 Connect/install the interface circuit to the microcontroller system.

11.7 Observe the input and output waveform using an oscilloscope.

11.8 Run/simulate the program to demonstrate the output result.

11.9 Prepare a report for the developed system.

12 Perform the tasks to design and develop a microcontroller based analog to digital conversion (ADC) interface system.

12.1 Design the schematic and component layout diagram of the system.

12.2 Construct the interface circuit according to the diagram.

12.3 Configure the ports for input/output operation.

12.4 Draw the flowchart of the program for performing the above tasks.

12.5 Save the program into an appropriate permanent memory (EEPROM).

12.6 Connect/install the interface circuit to the microcontroller system.

12.7 Observe the input and output waveform using an oscilloscope.

12.8 Run/simulate the program to demonstrate the output result.

12.9 Prepare a report for the developed system.

13 Perform the tasks to design and develop a microcontroller based traffic light interface system for controlling the direction and movement of vehicles at a junction of 4 roads.

13.1 Design the schematic and component layout diagram of the system.

13.2 Construct the interface circuit according to the diagram.

13.3 Configure the ports for input/output operation.

13.4 Draw the flowchart of the program for performing the above tasks.

13.5 Save the program into an appropriate permanent memory (EEPROM).

13.6 Connect/install the interface circuit to the microcontroller system.

13.7 Run/simulate the program to demonstrate the output result.

13.8 Prepare a report for the developed system.

Programmable Logic Controller

14 Identify the parts and components of a PLC system

15 Perform the tasks to develop and Simulate/execute a PLC ladder program(diagram) to start and stop a motor using two separate switches.

16 **Perform the tasks to develop and Simulate/execute PLC ladder program (diagram) using timer instructions**.

17 **Perform the tasks to develop and Simulate/execute a PLC ladder program (diagram) using counter instructions.**

18 **Perform the tasks to develop and Simulate/execute a PLC ladder program (diagram) using sequence instructions**

19 **Perform the tasks to develop and Simulate/execute a PLC ladder program (diagram) using arithmetic instructions**

20 **Perform the tasks to develop and Simulate a PLC ladder logic(diagram) to set both On-delay time and Off delay time functions.**

21 **Perform the tasks to develop and Simulate a PLC ladder logic(diagram) to control a push On/push Off circuit.**

22 **Perform the tasks to develop and Simulate a PLC ladder logic(diagram) to control a First –in-input priority circuit(when there are plural(5) inputs, the circuit is used to accept only the first input and ignore all subsequent inputs. The circuit accepts only the first input after it has been cleared by a reset input.**

23 **Perform the tasks to develop and Simulate a PLC ladder logic(diagram) to control a Non–lock-in annunciation circuit(Here if a failure occurs then it generate an alarm display output. If failure removes or one press a reset switch then alarm display automatically disappears. Assume a lamp start flickering and a buzzer starts sounding at the occurrence of failure. If reset is pressed then buzzer stops sounding and lamp stops flickering but remains on until failure removes.**

24 **Perform the tasks to develop and Simulate a PLC ladder logic(diagram) to control a Non–lock-in annunciation circuit(Here if a failure occurs then it generate an alarm display output. If failure removes or one press a reset switch then alarm display automatically disappears. Assume a lamp start flickering and a buzzer starts sounding at the occurrence of failure. If reset is pressed then buzzer stops sounding and lamp stops flickering but remains on until failure removes.**

25 **Perform the tasks to develop and Simulate a PLC ladder logic(diagram) to control a filling control circuit.**

26 **Perform the tasks to develop and Simulate a PLC ladder logic (diagram) to control a Conveyor belt motor control circuit.**

****One practical class must be conducted on Microcontroller and another on PLC per week.**

Reference Web address and books

1. PIC16F84A Data sheet - http://www.microchip.com

2. User Manual for PIC16F84A Training Kit - http://www.microprocessorinstitute.edu

3. The 8051 microcontroller and embedded systems using assembly and C
– Muhammad Ali Mazidi

4. Microcontroller (theory and applications)
– Ajay V Deshmukh

5. Training manual –Programmable logic Controller and its application in industrial automation. –Institution of Engineers, Bangladesh, H/Q ,Ramna,Dhaka-1000

6. Programmable Logic Controllers.
– W. Bolton

2692 # Java Programming

T	P	C
2	3	3

AIMS

To develop the knowledge and skill in Java language, it's syntax, keyword, and fundamental programming principles.

To develop the understanding and skill on Java's key API libraries: applets and servlets, Java Beans and Swing.

To develop the understanding and skill in Object Oriented Programming (OOP).

SHORT DESCRIPTION

Java Fundamentals:
Creation of Java and Principles of OOP, Overview of Java, Data Types, Variables, Arrays, Operators, and Control Statements, Classes, Objects, Methods, and Constructors,

Inheritances, Polymorphism, packages and Interfaces:
Understanding Inheritance and Polymorphism, Packages, Interfaces, Multithreaded Programming, Enumerations, Autoboxing, and Annotations (Metadata), Applets, Abstract Window Toolkit (AWT),

Java Beans, Swing, Servlets:
Application of Java Beans, Swing, Servlets

DETAIL DESCRIPTION

Theory:

Java Fundamentals

1 Understand the creation of Java and principles of OOP

1.1 Describe the history and creation of Java.
1.2 Explain that Java is the Internet Version of C++.
1.3 Review the terms like objects, classes, data abstraction, encapsulation, inheritance, polymorphism, message passing, and dynamic binding etc.
1.4 Describe the typical Java development environment.
1.5 Mention the differences between java and C++ as an OOP.

2 Understand the overview of Java

2.1 Describe the features of Java (i.e. java buzzwords).
2.2 Mention the applications of Java.
2.3 Explain a simple programming style and convention of Java.
2.4 Describe the lexical issues such as white space, identifiers, literals, comments, separators and keywords of Java.
2.5 List the Java keywords.
2.6 Identify the structure of Java program.
2.7 Describe the Java as a Virtual Machine (JVM).

3 Data types, Variables, Arrays, Operators and Control Statements

3.1 State the data types (primitives, non-primitive and literals) of Java programs.
3.2 Describe the declaration and dynamic initialization of variables in java.
3.3 Describe the scope and lifetime of variables in java.
3.4 Describe the operators in java.
3.5 Describe the one-dimensional and multi-dimensional array in java.
3.6 Describe the implementation of different control structures in java.
3.7 Explain the java programs that related to arrays, operators and control statements.

4 Classes, Objects, Methods, and Constructors

4.1 Describe the declaration (syntax) of class and object in Java.
4.2 State to assign object reference variables.
4.3 Define the method with syntax.
4.4 State to add a method to the class.
4.5 Describe the advantages of method.
4.6 Describe the overloading method in java.
4.7 Describe the constructor and overloading constructor in java.
4.8 Explain the instance variable hiding, and garbage collection.
4.9 Write java programs that related to class, object, method and constructor.

Inheritances, Polymorphism, Packages and Interfaces

5 Understand the inheritance and polymorphism

5.1 Define super class and sub class.
5.2 Explain the multilevel hierarchy of inheritance.
5.3 Describe the overridden methods in java.
5.4 Describe dynamic run-time polymorphism in java.
5.5 Describe the abstract and object classes in java.
5.6 Mention the uses of final keyword.
5.7 Write java programs that related to inheritance and polymorphism.

6 Understand Packages and Interfaces

6.1 Define the packages with syntax
6.2 Describe the function of packages
6.3 Mention the different levels of class member access.
6.4 Define the interfaces with syntax.
6.5 Describe the implementation of interfaces.
6.6 Explain the nested interfaces.
6.7 Describe the variables in interfaces.
6.8 Write java programs that related to package and interface.

7 Understand multithreaded programming

7.1 Define multithreaded programming with syntax.
7.2 Mention the different between processed-based and thread-based multitasking
7.3 Mention the several methods of thread class with state diagram.
7.4 Describe the way to create the several types of thread.
7.5 Describe the minimum, default and maximum thread priorities.
7.6 Describe the synchronization interthread communication method.
7.7 Describe the suspending, resuming and stopping threads.
7.8 Write java programs that related to multithreaded programming.

8 Understand Enumerations, Autoboxing, and Annotations (Metadata)

8.1 Define enumeration with syntax.
8.2 Mention the different between values () and value of () methods.
8.3 Describe the type wrappers in java program.
8.4 Describe the different types of Autoboxing/Unboxing.
8.5 Describe the Annotations with example.
8.6 Describe the different types of built-in annotations.
8.7 Mention the restrictions of annotations.
8.8 Write java programs that related to Enumerations, Autoboxing, and Annotations.

9 Understanding I/O Operations

9.1 Describe the Byte stream and Character Stream Classes.
9.2 Describe the Reading Console Input and Writing Console Output.
9.3 Mention the constructors to create File objects.
9.4 Describe the Reading and Writing files in java.
9.5 Describe flowchart of complete java streams.
9.6 Describe the random access File Streams.
9.7 Write java programs that related to I/O operation.

10 Understand Applets

10.1 Describe the Applet fundamentals
10.2 Mention the Restriction of Applets.
10.3 Describe the Applets life cycle.
10.4 Explain Frame Window in an Applet.
10.5 Write the java programs that related to Applets.

11 Understand Abstract Window Toolkit (AWT)

11.1 Explain AWT Control Fundamentals.
11.2 Mention the application of AWT.
11.3 Describe the class hierarchy for Panel and Frame.
11.4 Describe the graphic in java for creating Line, Rectangle, Arc, Circle, Ellipse and Polygon.
11.5 Describe Color Methods in java to manipulate primary colors.
11.6 Describe the terms Hue, Saturation and Brightness.
11.7 Describe the three common operations to create an Image.
11.8 Mention the function of Image Producer, Image Observer, Image Consumer, Media Tracker, and Cell Animation.
11.9 Write java programs that related to Windows, Graphics, Color, Image, and Sound

Java Beans, Swing, Servlets

12 Understand Java Beans

12.1 Define Java Bean.
12.2 Mention the advantages of Java Bean.
12.3 Mention the function of interfaces and classes in java beans.
12.4 Write java programs that related to Java Beans.

13 Understand Swing

13.1 Define swing.
13.2 Explain the features of swing.
13.3 Describe the Swing Components, Containers, and Packages.
13.4 Write java programs that related to Swing.

14 Understand Servlets

14.1 Define Applets and Servlets
14.2 Mention the advantages of Servlets
14.3 Describe the life cycle of a Servlets.
14.4 Write java programs that related to Servlets.

Practical:

01. Write and execute java program to implement a line of text.
02. Write and execute java programs that related to arrays, operators, and control statements.
03. Write and execute java programs that related to class, object, method and constructor.
04. Write and execute java programs that related to inheritance and polymorphism.
05. Write and execute java programs that related to package.
06. Write and execute java programs that related to interface.
07. Write and execute java programs that related to multithreaded programming.
08. Write and execute java programs that related to Enumerations, Autoboxing, and Annotations.
09. Write and execute java programs that related to I/O operation.
10. Write and execute java programs that related to Applets.
11. Write and execute java programs that related to Windows, Graphics, Color, Image, and Sound
12. Write and execute java programs that related to Java Beans
13. Write and execute java programs that related to Swing.
14. Write and execute java programs that related to Servlets.

REFERENCE BOOKS

1. The Complete Reference Java Herbert Schildt
2. JAVA How to Program- P.J. Deitel and H.M. Deitel
3. সান জাভা ২ জাহিদ খান; মিন্টু লাল সাহা; জয়ন্ত কুমার সাহা; আব্দুল আহাদ মুরাদ

2693 SYSTEM ANALYSIS DESIGN AND DEVELOPMENT T P C
2 3 3

AIMS

To provide the students with an opportunity to acquire knowledge, skill and attitude in the fields of system analysis, design and computer based development with special emphasis on:

- system concept
- system analysis
- system design & implementation
- OOA/D concept

SHORT DESCRIPTION

- System concepts, System analysis, System design and implementation, OOA/D.

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DETAIL DESCRIPTION

Theory:

SYSTEMS CONCEPTS

1 Understand the elements of information systems and management.

1.1 Define system and information systems.
1.2 Mention the characteristics of systems.
1.3 Describe the key elements of a system.
1.4 Define open and closed system.
1.5 Describe the characteristics of open system.
1.6 Describe the categories of information.
1.7 State the qualities of information.
1.8 State the need of computer based information system.
1.9 Describe the Management and Information System levels in an organization.

2 Understand the Organizational functions and system development life cycle.

2.1 State the common functions of an organization.
2.2 State the administrative functions an educational institution.
2.3 State the functions of various departments of a manufacturing organization.
2.4 State the difference between batch processing and on line transaction processing.
2.5 State the meaning of system development life cycle.
2.6 Describe the function of each stages of system development life cycle (SDLC).

3 Understand the roles of system analyst and functions of MIS facility center.

3.1 State the meaning of systems analysis
3.2 Describe the skills required for a system analyst.
3.3 Describe the relationship between interpersonal and technical skills required in different stages of system development.
3.4 Mention the background experiences and attributes of system analyst.
3.5 Mention the primary functions of an MIS facility center.
3.6 State the activities of administration in an MIS facility center.
3.7 Describe different structures of systems analysis.
3.8 Describe different structures of programmers and operators.
3.9 State the responsibilities and duties of an system analyst in an MIS facility center.
3.10 Compare the responsibilities of system analyst and programmer in an MIS facility center.

4 Understand the process of initial investigation and information gathering.

4.1 Mention the steps of systems analysis.
4.2 State the meaning of system planning.
4.3 Name the fields of a user request form.
4.4 Describe the steps of initial investigation process.
4.5 Mention the sources of information.
4.6 State the strategies of information gathering.
4.7 Mention the phases of information gathering.
4.8 Mention the categories of information.
4.9 List the information gathering tools.
4.10 Describe the information gathering methods.
4.11 State the guideline of a successful interview.
4.12 State the types of questionnaires.
4.13 Mention the types of closed questionnaires.

5 Understand the tools of structured analysis.

5.1 Describe the steps of system analysis.
5.2 State the meaning of structured analysis.
5.3 Name the tools of structured analysis.
5.4 Define physical document flow diagram and logical data flow diagram (DFD).
5.5 State the meaning and functions of DFD symbols.
5.6 Mention the thumb rules of drawing DFDs.
5.7 Draw sample document flow diagram and data flow diagram (DFD).
5.8 State the meaning of decision trees, decision table, structured English and data dictionary.
5.9 Prepare DFD, decision trees, decision table, structured English and data dictionary for sample small process like store/purchase/accounts /order/receive etc.

6 Understand the feasibility analysis.

6.1 Mention the meaning of feasibility study.
6.2 Describe the economic, technical and behavioral feasibility.

6.3 Describe the steps in feasibility analysis.
6.4 State the categories of cost and benefit.
6.5 State the procedure for cost/benefit determination.
6.6 State the content of broad solutions of feasibility analysis.
6.7 State the alternating solutions to be examined during feasibility analysis.
6.8 State the content of feasibility report.

7 Understand the system design.

7.1 Mention the meaning of systems design.
7.2 Distinguish between logical design and physical design.
7.3 Mention activities covered in systems design.
7.4 Mention the steps in physical systems design and design methodologies.
7.5 Mention the meaning of input/output design.
7.6 Mention the characteristics of different forms.
7.7 Describe the factors to be considered to design a form .
7.8 Describe the objectives of database.
7.9 Describe the steps of database design.
7.10 State the structure and general principles to be used in designing output reports.

8 Understand the process of systems testing and security.

8.1 Describe the objectives of control and testing the information systems.
8.2 Describe different types of systems test.
8.3 Describe the quality factor specification.
8.4 State the requirements to be met to ensure security of information systems.

9 Understand the implementation and software maintenance activities.

9.1 Mention the activities considered in systems conversion.
9.2 Describe the need of user training.
9.3 Describe the post implementation activities.
9.4 Name various types of software.
9.5 State the steps of determination of computer configurations.
9.6 State the points to be mentioned for requesting proposal from vendors.
9.7 Prepare a feature form to make a comparative evaluation of vendors' proposal for computer system.

10 Understand the concept of object oriented analysis and design.

10.1 Define object oriented analysis and design.
10.2 Define Unified Modeling Language (UML).
10.3 State the ways to apply UML.
10.4 Describe the perspectives to apply UML.
10.5 Define Unified Process.
10.6 Describe the Iterative and Evolutionary development.
10.7 State the benefits of iterative development.
10.8 State the Unified Process (UP) phases.

Practical:

1 Perform the collection of documents to recognize the need of a new computerized system.

1.1 Name the existing system & give general statements of the problem.
1.2 Collect the organization chart of the existing system.
1.3 Collect the materials such as forms, files, reports and other documents of the existing system.
1.4 Note down the data and information found in the material collected.
1.5 Classify the materials collected as (i) input materials, (ii) output (reports) materials and (iii) procedure materials.

2 Perform the collection of information of the personnel currently solving the problem into the manual system.

2.1 List all personnel currently solving the problem (i.e. working with the manual system).
2.2 Make a rough group of the personnel of
  i) Clerical & service staff.
  ii) Supervisory staff.
  iii) Middle management & professional staff, and
  iv) Executive management staff.
2.3 Modify the organization chart to reflect all personnel involved in the current system.

3 Perform the observation of existing system process & gather information by interview and questionnaires.

3.1 Observe the working procedures of the existing (manual) system.
3.2 Prepare questionnaires and take interview of the related personnel to know the necessary information.
3.3 Draw the physical document flow diagram and logical data flow diagram of the existing system and verify them with the user's function.
3.4 Prepare decision trees, decision table, structured English and data dictionary for the most important part of above DFD.
3.5 Identify the entities and properties of the system considering existing documents, observation, questionnaires and interviews.
3.6 Draw the relationship of the entities (data model-entity relationship diagram) & verify these with the end-users.

4 Perform the preparation of end-user's requirements & select the feasible solution for the alternative candidate systems.

4.1 Identify output requirements of the modified systems.
4.2 Identify input requirements.
4.3 Identify processing requirements.
4.4 Identify the constraints and limitations of the systems.
4.5 Draw the process models and data models of the new system.
4.6 Verify the models with the end-users.
4.7 Prepare different possible solutions for the system.

4.8 Prepare technical, operational & economic feasibilities of each solution.
4.9 Select the best solution within the budget of the organization.
4.10 Prepare the statements of scope and objectives of the new systems.

5 Perform the design of external forms, input & dialogue screens.
5.1 Prepare input/output specifications for the selected system.
5.2 Prepare security & control specifications.
5.3 Specify the implementation plan.
5.4 Design input source documents.
5.5 Design online data entry screens.
5.6 Design dialogue screens.
5.7 Design different types of message of the systems.
5.8 Verify each design item with the end-users.

6 Perform the design of reports, display screens & databases.
6.1 Design the structures of outputs reports.
6.2 Design the structures of output display.
6.3 Design the structure of the memory variables.
6.4 Design the structures of conventional files.
6.5 Design the structures of database files.
6.6 Verify each design item with the end users.

7 Perform the design of test plan & procedure.
7.1 Design process & modules.
7.2 Design test plan for each module and integrated module.
7.3 Verify each design item with end users.

8 Perform the selection of tools, databases and development of menus.
8.1 Select suitable system development languages & tools (preferably a 4GL).
8.2 Develop files & database and their access orders.
8.3 Develop background screen for the system and the organization.
8.4 Develop main menus and submenus.

9 Perform the development of input screens and dialogues.
9.1 Develop input screens (for entry, edit & delete).
9.2 Develop message and control procedures.
9.3 Test each module with data according to the test plan.

10 Perform the development of modules for data entry & processing.
10.1 Develop each module for data entry, edit & delete.
10.2 Develop each module for processing data.
10.3 Test each module with data according to the test plan.

11 Perform the development of modules for output display and printing.
11.1 Develop output display screens.
11.2 Develop procedures for each display screen.

11.3 Develop output reports printing procedures.
11.4 Test each modules with data according to the test plan.

12 Perform the integration & testing of the developed systems.
12.1 Integrate the new system.
12.2 Test the new system.
12.3 Modify the system if necessary.

13 Perform the preparation of manuals & documentations.
13.1 Write final documentations into the source code.
13.2 Write user and technical manuals.
13.3 Install the system for the user.
13.4 Present the new system to the authorities and users.

REFERENCE BOOKS

1. System Analysis and Design
- Elias M. Awad
2. Analysis and Design of Information Systems
- V. Rajaraman
3. System Analysis and Design Methods
- Whitten, Bently, Barlow
4. Applying UML and Patterns
-Craig Larman.

2694 DATA COMMUNICATION AND COMPUTER NETWORK –II

T	P	C
2	3	3

AIMS

- To be able to develop knowledge, skill and attitude in computer communication networks and media access control methods.
- To be able to acquire knowledge, skill and attitude of network architectures, protocols, standards, connectivity, services, security and management.

SHORT DESCRIPTION

Computer communication network and media access control methods, Network architectures and standards; Network connectivity and services; Network security and management.

DETAIL DESCRIPTION

Theory:

COMPUTER COMMUNICATION AND COMPUTER NETWORK

1 Understand computer communication Networking.

1.1 Mention the problems of communicating devices for directly, point-to-point connection with their solutions.
1.2 Describe the way of connecting network stations via communication network.
1.3 Mention the categories of Communication Network based on data transfer technique.
1.4 Mention the difference between switching and broad cast communication networks.
1.5 Describe the role of circuit switching, packet switching, frame relay, ATM and ISDN.
1.6 Mention the difference between circuit switching and packet switching.

2 Understand the Server based and peer computer networks.

2.1 Define client, Server and peer computer in a network.
2.2 Describe the Server-based Network and Domains.
2.3 Describe the peer network.
2.4 Mention the advantages and disadvantage of Server based and peer networks.
2.5 Describe the roles and common types of servers.
2.6 Mention the deference between DNS and DHCP Server

3 Understand Wireless Networking.

3.1 Define wireless Networking.
3.2 Mention the need of wireless Network.
3.3 Define access Point.
3.4 Describe transmission techniques of wireless Networking.

3.5 Mention the types of wireless Network.
3.6 Describe the types of wireless NIC.
3.7 Mention the uses of wireless Network.
3.8 Describe the role of Y-Max technology in modern communication system.
3.9 Describe about Bluetooth Technology

4 Understand the Media access control design issues for LAN System.

4.1 Mention different techniques of media access control.
4.2 Describe the round robin/ polling, reservation and contention based access control techniques.
4.3 Describe collision on a contention based network.
4.4 Describe the operation of CSMA/CD access control.
4.5 Describe the operation of token ring and token bus access control.
4.6 Describe the comparison of media access control techniques (i, e, CSMA/CA Vs CSMA/CD, CSMA/CD Vs Token passing, CSMA/CD Vs Demand priority access control).

NETWORK PROTOCOL ARCHITECTURES AND STANDARDS

5 Understand the TCP/IP protocol architecture.

5.1 Define process, host and network.
5.2 Mentions the layers of TCP/IP protocol architecture.
5.3 Explain the functions of each layer of TCP/IP protocol architecture.
5.4 Describe the communication using TCP/IP protocol architecture with Block diagram.
5.5 State the Hierarchy of some the key protocols commonly implemented as part of the TCP/IP protocol suite.
5.6 Explain the role of TCP/IP protocol interface.
5.7 Compare the layering structure of TCP/IP suite and OSI model.

6 Understand the IEEE 802.x standards and Ethernet.

6.1 State the objective of the 802 project model.
6.2 Describe the important features of the IEEE 802 categories.
6.3 State the relation between standard IEEE 802, and OSI model.
6.4 Mention Ethernet Basic Features.
6.5 Describe 5-4-3 rule of thumb for thicknet and thinnet Ethernet LAN.
6.6 Describe the features of demand priority access LAN/100 base VG Any LAN.

7 Understand token-passing standard.

7.1 Mention the features of Token-Ring MAU/MSAU and SMU.
7.2 List the components of Token-Ring LAN.
7.3 Describe the types and specification of Token-Ring cabling system.
7.4 Mention roles of active and stand by Monitors.
7.5 Describe the procedure of beaconing process to point out breaks on a Token ring Network.
7.6 Mention the advantages and disadvantages of using Token ring network.

8 Understand Fiber Distributed Data Interface (FDDI).

8.1 Describe the working procedure of FDDI.
8.2 Mention the advantages and disadvantages of using FDDI in networking.
8.3 Describe the role of dual counter rotating ring in the event of device or cable failure in FDDI.
8.4 Describe the important features of FDDI components.
8.5 Draw the layout diagram of FDDI network using concentrators.

NETWORK CONNECTIVITY AND SERVICES.

9 Understand the connectivity devices.

9.1 List the connectivity devices used in networking.
9.2 Describe MODEM performances.
9.3 Describe MODEM types and Standard.
9.4 Describe the features of ADSL and Digital MODEM.
9.5 Describe the role of transceivers in a Network.

10 Understand Network Interface Cards (NIC)

10.1 State the role of NIC.
10.2 Describe the network address.
10.3 Mention the points that agree both the sending and receiving NICs.
10.4 State the importance of base memory address for NIC.
10.5 Mention the important points to maintain the compatibility among NIC, bus and cables.
10.6 Describe the NIC related factors that enhanced the performance of network.

11 Understand the Hubs, Repeaters and Bridges.

11.1 Describe the functions of Hubs, Repeaters and Bridges in network.
11.2 Mention the types of Hubs.
11.3 Describe the important features of passive, active and intelligent Hubs.
11.4 Describe the important features of Repeaters and Bridges.
11.5 Explain the uses of routing tables to reduce the traffic on the network.
11.6 Explain how a routing table allows Bridges to segment networks.
11.7 Mention the Differentiate between Bridges and Repeaters.

12 Understand the internetwork connectivity devices.

12.1 List the common internetwork connectivity devices.
12.2 Describe the functions and operation of Routers, Brouters, CSU/DSUs and Gateways.
12.3 State the meaning of alternative routes (paths) of Routers.
12.4 Mention the features of different types of Routers.
12.5 Mention the difference between Bridges and Routers.
12.6 Mention the features of Brouters and Gateways.
12.7 Describe the uses of Gateways.

13 Understand connection services.

13.1 Mention the common network services.
13.2 Define Dial-Up lines and leased lines.
13.3 Define Remote Access Service (RAS).
13.4 State the meaning and use of VPN, DUN, PSTN.
13.5 Describe RAS protocols.
13.6 Describe the limitations of RAS.

NETWORK SECURITY AND MANAGEMENT

14 Understand the network security.

14.1 Define network security.
14.2 Mention the essentials of LAN security.
14.3 Describe the levels of security.
14.4 Describe the role of network management.
14.5 State the meaning of the terms: Control, Management, Maintenance and Administration in networking.
14.6 Describe the network management functions.

Practical:

1. Install a Linux based server.
2. Assign IP address and Host name.
3. Manage Remote Login through TELNET/SSH.
4. (i) Configure File Transfer protocol (FTP)/ Network File System (NFS).
5. File Transfer using TCP and UDP.
6. Configure Samba server configuration.
7. Install and manage Domain name system (DNS).
8. Manage Dynamic Host Configuration protocol (DHCP).
9. Manage DNS client and secondary DNS.
10. Configure Mail server, Web server and proxy server.
11. Manage security policy.
12. Configure Linux PC as a router.
13. Implement a linux network with minimum five computers.
14. Implement a wireless network with minimum five computers.

REFERENCE BOOKS

1 Data & Computer Communications, –by Willian Stallings
2 Computer Networks, - by Andrew S. Tanenbaum.
3 Networking Essentials, - MCSE Study Guide.
4 Learning Red hat Linux-By Bill Mc Carty.
5 Linux- By Kamaran Hossain

4586	MULTIMEDIA AND GRAPHICS	T	P	C
		2	3	3

AIMS

To provide the students with an opportunity to acquire knowledge, skill and attitude in the field of multimedia and Graphics with a special emphasis on:

- basics of multimedia
- multimedia hardware/software essentials
- system components, Architecture and development tools used in multimedia
- Coding and compression in multimedia.
- Basics of Graphics.
- Image Processing
- Scan Converting Process.
- Two & Three dimensional transformation
- Concept of Projection.

SHORT DESCRIPTION

Basics of Multimedia; Multimedia hardware/software essentials; system coding and compressing in multimedia; System components, Architecture and development tools used in multimedia; image, sound and video in multimedia, basics of graphics; image processing; Scan converting process; Two & Three dimensional Transformation; Concept of projection

DETAIL DESCRIPTION

Theory:

1 Understand the basics of multimedia.

1.1 Define multimedia and multimedia systems.
1.2 Describe the history of multimedia.
1.3 Classify multimedia system.
1.4 Mention the affects of multimedia on human life.
1.5 State the need of multimedia.
1.6 Classify multimedia application & information.

2 Understand different Media and media process system in multimedia.

2.1 Mention the types of media in multimedia system.
2.2 Define discrete and continuous media.
2.3 Describe the discrete media process system in multimedia.
2.4 Define sampling, sampling interval, quantization and quantization error.
2.5 Describe the digitizing process of audio & video signal.
2.6 Describe the different visual process system (e.g.: RGB, YUV, analog video signal).
2.7 State the features of NTSC, PAL and SECAM system.

3 Understand the architecture of multimedia system

3.1 Mention the components of a multimedia system.

3.2 Describe the architecture of a multimedia system.
3.3 List the main issues in multimedia system.
3.4 Describe the congestion control.
3.5 Briefly describe the terms Admission control, Traffic control, Buffer management and scheduling.

4 Understand the compression and coding techniques.

4.1 Define data encoding and Image compression.
4.2 Mention the classification of encoding techniques.
4.3 Describe image compression system.
4.4 Mention various compression system standards.
4.5 Define JPEG, JBIG and MPEG.
4.6 Describe JPEG compression process.
4.7 Briefly describe the MPEG audio and video process.

5 Understand the multimedia hardware/software and development tools.

5.1 Define multimedia studio.
5.2 Describe the industrial standards and specifications of a typical multimedia configuration.
5.3 Define multimedia software.
5.4 Describe important features of different categories of multimedia software.
5.5 Mention different types of development tools for building multimedia applications.
5.6 Mention the meaning of cross plate form compatibility.
5.7 Define hypertext and hypermedia.
5.8 State the meaning of nodes, links, windows, etc in a hypertext system with figures.
5.9 Mention different types of hypermedia systems.

Graphics

6 Understand the image representation system.

6.1 Define computer graphics,
6.2 Define object space, image space and image processing.
6.3 Define pixel, raster, resolution and aspect ratio.
6.4 Describe RGB and CMY color model.
6.5 Mention the direct coding, color lookup table and image files.
6.6 Describe the function color setting.

7 Understand the Scan converting process.

7.1 Define Scan conversion.
7.2 Describe the point and line scan Converting process.
7.3 Mention the Bresenham's line algorithm.
7.4 Describe the circle scan converting process and its algorithm.
7.5 Mention the ellipse scan converting process.

8 Understand the two-dimensional transformation.

8.1 Define transformation, translation, rotation, scaling and magnification.
8.2 Describe the geometric transformation.
8.3 Describe the co-ordinate transformations.
8.4 Define composite transformation and instance transformation.

8.5 Mention the matrix description of the basic transformation.

9 Understand the two-dimensional viewing and clipping.

9.1 Define WCS, VCS, Window, Viewpoint, workstation and NDCS.
9.2 Describe the window to view port mapping.
9.3 Define point clipping.
9.4 State the Cohen-Sutherland algorithm.
9.5 Describe the polygon clipping.

10 Understand the three dimensional transformation.

10.1 Describe the three dimensional geometric transformation.
10.2 Mention the co-ordinate transformation.
10.3 Define projection, projection plane and projector.
10.4 Mention the taxonomy of projection.
10.5 State the mathematical description of a perspective projection.

Practical:

1 Identify the hardware of multimedia systems and prepare their specifications.
2 Prepare the hardware specification settings and connection diagram of sound equipments (ware and wireless).
3 Perform the task to work with digital video recording and editing software for multimedia.
4 Manipulate and process sound and video files using different software packages.
5 Work with digital video recording and editing from VCR/laser/disk player/video camera using appropriate multimedia software.
6 Write a program and execute the Bresenham's line algorithm using an appropriate language.
7 Write a program and execute the Bresenham's circle algorithm using an appropriate language.
8 Write a program and execute the Cohen –Sutherland line algorithm using an appropriate language.
9 Write a program and execute the Liang - Borski algorithm using an appropriate language.
10 Write a program and execute the wailer- Atherton algorithm using an appropriate language.

REFERENCE BOOKS

1. Multimedia in practice technology and applications
- **Judith Jeffcoate**

2. Networked Multimedia Systems Concepts, Architecture & Design.
- **S. V. Raghavan**
- **Satish K. Tripathi**

3. Computer graphics
- **Schaum's Out lines Series**

2696 COMPUTER SERVICING – II

T	P	C
0	3	1

AIMS

- To be able to develop the skill in error detection or correction.
- To be able to develop the skill in PC servicing.
- To be able to develop expertise in board/components level troubleshooting of power supply, monitor, printer and I/O devices.
- To be able to develop the skill in PC maintenance (hardware and software).
- To be able to develop the skill in network maintenance and troubleshooting.
-

SHORT DESCRIPTION

General troubleshooting techniques; Troubleshooting in power supply and main board; Fault finding and repairing of monitor, printers and mass storage devices,; Troubleshooting in ports and modems; Setting the PC for best operating environment; Software, hardware and special maintenance of PC and Computer network.

DETAIL DESCRIPTION

1 Perform the tasks to provide the suitable operating environment for computer system.

1.1 Select the tools and equipment.
1.2 Maintain a temperature controlled, air-conditioned environment for large main frame computer.
1.3 Prepare a clean, quiet, dust free, cool and neither too damp nor too dry surroundings for PCs.
1.4 Cover the PC system units not immediately after using it.
1.5 Keep the PCs far away from direct sunlight, heater or vent.
1.6 Use cooler over socketed ICs to avoid mechanical stress.
1.7 Place the machine far away from wall and other barrier.
1.8 Keep the top of the system unit and monitor top free from pile of papers, manuals or disks.
1.9 Keep a dehumidifier in computer lab/ center.
1.10 Choose a dirt and dust free environment.
1.11 Keep the place as well as the PC units neat and clean with regular maintenance.
1.12 Avoid shock, jarring and vibration to handle a PC and its individual units.
1.13 Ensure the static discharge before touching a circuit board.
1.14 Ensure a stable and smooth AC supply to run the PC.

2 Perform the tasks to find out and remedy the faults of PC for the symptoms like nothing shown into the display/monitor where the power supply and the display/monitor are in good condition.

2.1 Select required tools, equipment, materials, manuals, etc.
2.2 List the possible cause of the mal functions (Problem to processor/RAM /BIOS etc.)
2.3 Apply the techniques logically to find out the fault for each types of causes.
2.4 Find out the fault by inspection, analysis, experience and testing.
2.5 Repair the fault using appropriate hardware or software tools.
2.6 Write down the appropriate elimination steps for complex symptoms
2.7 Perform the test one by one and then replace / repair the defective one.
2.8 Test the operation of the PC.

3 Perform the tasks to repair a PC in card / board / unit level (symptoms-PC restarted again and again where the power supply is in good condition.

3.1 Select required elements.
3.2 List the possible cause of the mal functions.
3.3 Specify the symptoms of the mal function.
3.4 Replace the faulty card / board / unit by a new / good one.
3.5 Run the PC for normal operation.

4 Perform the tasks to diagnosis the faults and repair the power supply of a PC.

4.1 Select required tools, equipment, manuals, etc.
4.2 Note and record the nominal power connector voltages.
4.3 Measure the voltages at different pins and check it with recorded tabulated voltages.
4.4 Measure the power good signal.
4.5 Write down the steps to check the power supply problems (e.g. for completely dead, momentarily work and fails after period of operation.
4.6 Repair or replace the faulty PS with a good one.

5 Perform the tasks to identify the faults of motherboard and remedy the problems.

5.1 Select the required elements.
5.2 Record the symptoms that are not attributable to a specific device.
5.3 Check the systems basic physical conditions ensure that all internal cables are connected, expansion cards are seated, ICs are socketed properly.
5.4 Disconnect the above mentioned elements and reinstall those to the appropriate location properly.
5.5 Run the diagnostic (if the machine can boots) to seek the causes of faults.

5.6 Check the memory errors and test both the base extended memory using advanced diagnostics or a third party product.
5.7 List the system faults for motherboard problems.
5.8 Write down the steps to replace a motherboard.

6 Perform the tasks to identify the problems of keyboard and mouse and remedy the problem.

6.1 Select the required elements.
6.2 List the common keyboard/ mouse problems.
6.3 Check the keyboard /mouse plugs and cable.
6.4 Substitute a known working keyboard/ mouse to ensure the internal problem.
6.5 Dismantle the keyboard/mouse to remove the dust, dirt, crumbs, hair, mouse droppings, dead insects and other vile miscellany.
6.6 Shake out the worst of the dust & dirt and brush away the rest from between the key switches using a soft brush or mini vacuum cleaner.
6.7 Wash the key board with distilled or demineralized water to clean up the dropped liquids such as coffee, soda pop, corrupt juice etc.
6.8 Reassemble the keyboard/mouse.

7 Perform the tasks to identify the parts and component of a color CRT/LCD monitor.

7.1 Select the required equipment, tools and manuals.
7.2 Open/Disassemble the monitor using appropriate tools.
7.3 Name the parts and components
7.4 Locate the power supply section and identify the components.
7.5 Locate the stages of the main circuit board.
7.6 Identify the major parts and components of each stages.
7.7 Check the qualities of color purity, convergence, linearity, etc.
7.8 Detach the CRT base circuit, yoke coil, purity magnet and convergence coil from the CRT.
7.9 Reassemble the parts and components using appropriate tools.

8 Perform the tasks to Repair the parts and component of a CRT/LCD monitor.

8.1 Select the required equipment, tools and manuals.
8.2 List the symptoms encountered in the CRT monitor.
8.3 Make a logical deduction of the symptoms to find the sources of the trouble.
8.4 Perform tests to check the faults step by step in different stages.
8.5 Replace the faulty parts/components

9 Perform the tasks to operate a printer and identify the common printing problems.

9.1 Select the required tools, equipment and manuals.
9.2 List the common symptoms encountered in printing with good printer.
9.3 Check the printer is in on-line.

9.4 Check the printer operation (self test), software configuration.
9.5 Check the cable is plugged into correct socket.
9.6 Ensure the cable wiring (handshake lines).
9.7 Check the software settings (speed, data format, etc) for a printer.
9.8 Check the cartridge or ribbon or toner condition.
9.9 Remedy the problems.

10 Perform the tasks to locate the faulty parts/components of a dot matrix/Ink jet printer and replace/repair the faulty parts/components.

10.1 Select the required tools, equipment and manuals.
10.2 Open/Disassemble the printer using appropriate tools.
10.3 Name the parts and components
10.4 Locate the mechanical assembly and its parts, power supply section, main circuit board and their components.
10.5 Check the condition of the head assembly/Ink cartage, ribbon, head pin driven data cables, belt, sensors, motors and gears.
10.6 Detach the mechanical assembly and its parts, power supply section and main circuit board.
10.7 Locate the faulty parts/components
10.8 Replace the faulty parts/components
10.9 Reassemble the parts and components using appropriate tools.

11 Perform the tasks to locate the faulty parts/components of a Laser printer and replace/repair the faulty parts/components.

11.1 Select the required tools, equipment and manuals.
11.2 Open/Disassemble the printer using appropriate tools.
11.3 Name the parts and components
11.4 Locate the mechanical assembly and its parts, power supply section, main circuit board and their components.
11.5 Check the condition of the scanning assembly, drum, fuser unit, head assembly, toner, gears etc.
11.6 Detach the mechanical assembly and its parts, power supply section and main circuit board.
11.7 Locate the faulty parts/components
11.8 Replace the faulty parts/components
11.9 Reassemble the parts and components using appropriate tools.

12 Perform the tasks to Identify the faults of HDD and remedy the problems

12.1 Select the tools, equipment, manuals, etc.
12.2 List the common faults and their possible solutions.
12.3 Check the drive type in CMOS RAM setup.
12.4 Check the cabling & controller seating and the power to the drives.
12.5 Check the drive select jumper setting.
12.6 Check the corruption of boot tracks (possible software or hardware fault or sector wraparound), repartition and reformat the HD and then reinstall the software.

12.7 Run the utility to check creeping disk errors, make partition and format if necessary.
12.8 Run the system tools (scandisk, Chkdsk, etc) to remedy the fragmentation.
12.9 Examine the bad sectors and recover the deleted or damaged files or loosing files due to the accidental use of format command.

13 Perform the tasks to identify the problems of modem and make solutions.
13.1 Check the connection among the modem, PC and the telephone line.
13.2 List the symptoms of communication problems.
13.3 Check the cables, switch, fuse, data cable, telephone line, etc.
13.4 Ensure the cable attached to the correct serial port.
13.5 Ensure the internal modem configured as correct serial port.
13.6 Ensure that two devices are not configured as the same port.
13.7 Check the software configuration for modern.
13.8 Check the protocol.

14 Perform the tasks to apply setup and optimization to improve the PC performance.
14.1 List the name of the files that runs during booting.
14.2 List the common device drivers that loaded at boot time.
14.3 Partition the hard disk for best performance.
14.4 Run the defragmenter to speed up the disk access.
14.5 Solve the most common configuration problems.
14.6 List the symptoms of virus affected machine.
14.7 List the name of virus detection software.
14.8 Load the anti-virus software into the machine.
14.9 Run the anti-virus to remove the virus.
14.10 List the preventive cares from virus infection.
14.11 Update the anti-virus software using offline/Online process.

15 Perform the tasks to provide careful preventive maintenance of PC.
15.1 Back up of all data.
15.2 Clean the PC, monitor, keyboard and other devices.
15.3 Check that all leads and cables are fully secured.
15.4 Clean the diskette drives using a commercial head cleaner.
15.5 Disconnect all cables and remove the system unit cover.
15.6 Clean out the deposited dirt.
15.7 Undo the retaining screws of each expansion card and remove it, reseat the socketed IC chips and replace it.
15.8 Check the all internal cables are fully secured.
15.9 Re-place the system unit cover, leads and cables and then test the machine.

16 Perform the tasks to identify the problem of a Computer Network and solve the problem.
16.1 List the symptoms of Computer Network related problems.

16.2 Check the connectivity of PC among the LAN and Gateway, IP configuration, different service server configuration and conditions.

16.3 Repair/ Replace the connector/Cable/Devices if required.

REFERENCE BOOKS

1. Upgrading Maintaining & Servicing IBM PCs & Compatibles
by Julian Moss.

2. IBM PC and CLONES
by B. Govindarajalu.

2684	COMPUTER ENGINEERING PROJECT-II	T	P	C
		0	3	1

AIMS

- To be able to understand the project concept paper (PCP)
- To be able to develop knowledge, skill and attitude of preparing different stages of computer hardware and software related project
- To be able to gather experience of writing report on project work.

SHORT DESCRIPTION

Hardware projects:

Digital clock, Digital voltmeter/multimeter, 4 functions ALU with conditional control system, Taxi cab meter system, Digital logic trainer, Simple as possible computer, Bit slice computer or any other Hardware/firmware project assigned by the teacher.

Software projects:
Information management system, Control system, Operating system, Packages, Educational/Entertainment software.

DETAIL DESCRIPTION

1 Perform the tasks to construct a digital clock with at least the features of the clock which (a) is able to show the seconds, minutes and hours (b) counts from 0 to 12 AM/PM (c) resets the time as required.

1.1 Design/collect the circuit diagram for constructing the project.
1.2 Prepare a study report including detail specifications, theories/working procedure of each stages/operation of major devices of the circuits.
1.3 Collect the components/devices/instruments/tools/project board according to the need.
1.4 Design components layout diagram.
1.5 Construct the circuits in a project board or prepare the circuit using electronic engineering software in a computer screen.
1.6 Connect the appropriate power of accurate voltage & current and observe the output or simulate the output in the monitor screen.
1.7 Test/reconstruct/modify the circuits if there any error or malfunction occurs during the output observation.
1.8 Design a printed circuit board (PCB) for the proposed project.
1.9 Prepare the PCB (manually/screen print method).
1.10 Install the components into the PCB and soldered carefully.
1.11 Connect the appropriate power with accurate voltage and current rating.
1.12 Observe the output operation.
1.13 Prepare a users manual.
1.14 Write the project report in detail.

2 Perform the tasks to construct a digital voltmeter with at least the features of the voltmeter which (a) is able to measures A/C and DC voltage from 0 to 999 volts and (b) shows the voltage in the seven segment display.

2.1 Design/collect the circuit diagram for constructing the proposed project.
2.2 Prepare a study report including detail specifications, theories/working procedure of each stages/operation of major devices of the circuits.
2.3 Collect the components/devices/instruments/tools/project board according to the need.
2.4 Design components layout diagram.
2.5 Construct the circuits in a project board or prepare the circuit using electronic engineering software in a computer screen.
2.6 Connect the appropriate power of accurate voltage & current and observe the output or simulate the output in the monitor screen.
2.7 Test/reconstruct/modify the circuits if there any error or malfunction occurs during the output observation.
2.8 Design a printed circuit board (PCB) for the proposed project.
2.9 Prepare the PCB (manually/screen print method).
2.10 Install the components into the PCB and soldered carefully.
2.11 Connect the appropriate power with accurate voltage and current rating.
2.12 Observe the output operation.
2.13 Prepare a users manual.
2.14 Write the project report in detail.

3 Perform the tasks to construct a four function ALU with at least the features which

(a) is able to perform simple arithmetic & logical operation
(b) controls the operation on the basis of some well defined condition
(c) shows the output result using both binary and seven segment display.

3.1 Design/collect the circuits diagram for constructing the proposed project.
3.2 Prepare a study report including detail specifications, theories/working procedure of each stages/operation of major devices of the circuits.
3.3 Collect the components/devices/instruments/tools/project board according to the need.
3.4 Design components layout diagram.
3.5 Construct the circuits in a project board or prepare the circuit using electronic engineering software in a computer screen.
3.6 Connect the appropriate power of accurate voltage and current and observe the output or simulate the output in the monitor screen.
3.7 Test/reconstruct/modify the circuits if there any error or malfunction occurs during the output observation.
3.8 Design a printed circuit board (PCB) for the proposed project.

3.9 Prepare the PCB (manually/screen print method).
3.10 Install the components into the PCB and soldered carefully.
3.11 Connect the appropriate power with accurate voltage and current rating.
3.12 Observe the output operation.
3.13 Prepare a users manual.
3.14 Write the project report in detail.

4 Perform the tasks to construct a meter system of taxi cab with the features of which is able to show the time, distance and amount of money on the basis of distance and time (where the clock of the system counts the wait time but stops during the running period).

4.1 Design/collect the circuit diagram for constructing the proposed project.
4.2 Prepare a study report including detail specifications, theories/working procedure of each stages/operation of major devices of the circuits.
4.3 Collect the components/devices/instruments/tools/project board according to the need.
4.4 Design components layout diagram.
4.5 Construct the circuit in a project board or prepare the circuit using electronic engineering software in a computer screen.
4.6 Connect the appropriate power of accurate voltage & current and observe the output or simulate the output in the monitor screen.
4.7 Test/reconstruct/modify the circuit if there any error or malfunction occurs during the output observation.
4.8 Design a printed circuit board (PCB) for the proposed project.
4.9 Prepare the PCB (manually/screen print method).
4.10 Install the components into the PCB and soldered carefully.
4.11 Connect the appropriate power with accurate voltage and current rating.
4.12 Observe the output operation.
4.13 Prepare a users manual.
4.14 Write the report of the project.

5 Perform the tasks to construct a digital logic trainer with at least the following features :

the trainer must contain 2 state (0,+5v) 8 data input, 2 extra 3 state (+5v,0 and –5v) control input switches, 2 push button clock input, a function generator with multiple frequency range, fixed voltage input (5v, ground and –5v), variable voltage source (0 to 15 volt) and (0 to –15v), project board, 8 bit binary and 2 digit Hexadecimal/BCD 7 segment display.

5.1 Design/collect the circuit diagram for constructing the proposed project.
5.2 Prepare a study report including detail specifications, theories/working procedure of each stages/major devices of the circuits.
5.3 Collect the components/devices/instruments/tools/project board according to the need.
5.4 Design components layout diagram.

5.5 Construct the circuits in a project board or prepare the circuit using electronic engineering software in a computer screen.
5.6 Connect the appropriate power of accurate voltage & current and observe the output or simulate the output in the monitor screen.
5.7 Test/reconstruct/modify the circuit if there any error or malfunction occurs during the output observation.
5.8 Design a printed circuit board (PCB) for the proposed project.
5.9 Prepare the PCB (manually/screen print method).
5.10 Install the components into the PCB and soldered carefully.
5.11 Connect the appropriate power with accurate voltage and current rating.
5.12 Observe the output operation.
5.13 Prepare a users manual.
5.14 Write the project report in detail.

6 Perform the tasks to construct a 8 bit SAP (simple as possible)/Bit slice computer.

6.1 Design/collect the circuit diagram for constructing the proposed project.
6.2 Prepare a study report including detail specifications, theories/working procedure of each stages/major devices of the circuits.
6.3 Collect the components/devices/instruments/tools/project board according to the need.
6.4 Design components layout diagram.
6.5 Construct the circuits in a project board or prepare the circuit using electronic engineering software in a computer screen.
6.6 Connect the appropriate power of accurate voltage and current and observe the output or simulate the output in the monitor screen.
6.7 Test/reconstruct/modify the circuit if there any error or malfunction occurs during the output observation.
6.8 Design a printed circuit board (PCB) for the proposed project.
6.9 Prepare the PCB (manually/screen print method).
6.10 Install the components into the PCB and soldered carefully.
6.11 Connect the appropriate power with accurate voltage and current rating.
6.12 Observe the output operation.
6.13 Prepare a users manual.
6.14 Write the project report in detail.

7 Perform the tasks to construct any other computer related engineering project work of same standard assigned by the teacher within the facilities available in the respective institute.

SOFTWARE PROJECT

8 Perform the tasks to develop any one of the following software using standard programming language (C/C++/Visual programming/Oracle/ HTML/XML/Java etc.).

i) Educational institute management system
ii) Hotel management system
iii) Digital clock
iv) Accounting software
v) Transport ticketing management system
vi) Departmental store management system
vii) Admission management system
viii) Billing management system.
ix) Any other computerized system/control system/operating system/ network system/ packages/ educational/ entertainment software.

8.1 State the abstract PCP of the proposed software.
8.2 Write the objectives of the proposed software.
8.3 Design the user interface of the proposed software in paper.
8.4 Choose an appropriate programming language.
8.5 Create different forms, buttons, label, text box, check box, combo box and menus according to the need of the software.
8.6 Create table if necessary.
8.7 Write codes for the above objects.
8.8 Run and test the program.
8.9 Debug and modify the program if needed.
8.10 Prepare users manual.
8.11 Write a detail report about the developed software.

NB :

a) Students must perform at least one (Hardware/firmware) engineering project and a software project in a semester.
b) Students may allow to perform the project works in group basis.
c) Number of students in a group should not be more than five.

1581	ENTREPRENEURSHIP	T	P	C
		2	0	2

AIMS

- To be able to understand the concept of entrepreneurship & entrepreneur.
- To be able to understand the concept of environment for entrepreneurship.
- To be able to understand the sources of venture ideas in Bangladesh.
- To be able to understand the project selection.
- To be able to understand the financial and business planning.

SHORT DESCRIPTION

Concepts of entrepreneurship & entrepreneur; Entrepreneurship & economic development; Environment for entrepreneurship; Entrepreneurship in the theories of economic growth; Sources of ventures ideas in Bangladesh; Evaluation of venture ideas; Financial planning; Project selection; Self employment; Entrepreneurial motivation; Business plan; Sources of assistance & industrial sanctioning procedure.

DETAIL DESCRIPTION

Theory :

1 Understand the basic concept of entrepreneurship & entrepreneur.

1.1 Define entrepreneurship & entrepreneur.

1.2 Discuss the characteristics and qualities of etrepreneur.

1.3 Mention the classifacation of entrepreneur.

1.4 Discuss the case entrepreneurship and mass entrepreneurship.

1.5 Discuss the necessity of entrepreneurship as a career.

1.6 Discuss the function of entrepreneur in developing countries.

1.7 Discuss the prospect of entrepreneurship development in Bangladesh.

2 Understand the concept of entrepreneurship and economic development.

2.1 Define economic development.

2.2 Discuss that the economic development is a process.

2.3 Describe the entrepreneurship as a factor of economic development.

2.4 Discuss the capital accumulation or rate of savings.

2.5 Discuss the role of entrepreneur in the technological development and their introduction into production Process.

2.6 Discuss the entrepreneur in the discovery of new sources of resources.

2.7 Discuss the entrepreneur in the discovery of new product.

2.8 Discuss the discovery of new markets.

3 Understand the concept of the environment for entrepreneurship.

3.1 Define environment of business.

3.2 Describe the factors which effect environment on entrepreneurship.

3.3 Discuss the aspects of business environment.

4 Understand the concept of entrepreneurship in the theories of economic growth.

4.1 Define entrepreneurship in the theories of economic growth.

4.2 Discuss the theory of need for achievement of Devid MacClelland.

4.3 Discuss the Malthusian theory of population and economic growth.

4.4 Discuss the labour theory of production and limit to growth.

4.5 Discuss the Keynesian theory of employment and output.

4.6 Discuss the stage theory of growth.

4.7 Discuss the Schumpterian theory of economic development.

4.8 Discuss the entrepreneurship motive in economic development.

5 Understand the sources of vanture ideas in Bangladesh.

5.1 Define sources of venture ideas in Bangladesh.

5.2 Discuss different types of sources of venture ideas in Bangladesh.

5.3 Discuss informal sources of venture ideas in Bangladesh.

6 Understand the evaluation of venture ideas.

6.1 Define evaluation of venture ideas.

6.2 Discuss the factors that influence the selection of venture ideas.

6.3 Discuss the evaluating financial aspects of business.

6.4 Discuss the determinats of the firm size.

7 Understand the financial planning.

7.1 Define financial planning.

7.2 Discuss the long term financial plan.

7.3 Discuss the short term financial plan.

7.4 Discuss the model of financial plan.

7.5 Describe the factors considered in estimation income.

7.6 Discuss the balance sheet and cash plan.

7.7 Discuss the fund flow statement.

8 Understand the concept of project selection.

8.1 Define project.

8.2 Discuss the idea of project.

8.3 Describe the guide lines for project ideas.

8.4 Discuss the sources of project ideas.

8.5 Discuss the evaluation of project ideas.

8.6 Describe the technical aspect of project.

8.7 Discuss the capital budgeting.

8.8 Discuss the discounted cash flow method.

9 Understand the concept of self employment.

9.2 Define self employment.

9.3 Describe different types of employment.

9.4 Describe the importance of business as a profession.

9.5 Discuss the reasons for success and failure in business.

9.6 Discuss the self assessment of entrepreneurial qualities.

10 Understand the concept of entrepreneurial motivation.

10.2 Define entrepreneurial motivation.

10.3 Discuss the achievement motivation theory.

10.4 Describe the means of improving achievement motivation.

10.5 Discuss the background of high need achievement.

10.6 Describe the problems associated with high need achievement.

11 Understand the business plan.

11.1 Define business plan.

11.2 Describe the importance of business plan.

11.3 Discuss the contents of business plan.

11.4 Describe the business plan proforma.

12 Understand the concept of sources of assistance & industrial sanctioning procedure.

12.1 Define sources of assistance.

12.2 Describe different types of sources of assistance.

12.3 Describe entrepreneurship development cycle.

12.4 Define foreign aid.

12.5 Discuss the aid of sources.

12.6 Discuss the industrial policy.

12.7 Describe the technique of industrial policy.

1582	INDUSTRIAL MANAGEMENT-II	T	P	C
		2	0	2

AIMS

- To be able to develop the management techniques in the process of decision making.
- To be able to manage the problems created by trade union.
- To be able to use the network planning, PERT, CMP and MBO.
- To be able to perform the marketing.
- To be able to understand the concept of case studies.

SHORT DESCRIPTION

Concepts and techniques of decision making; Concept of trade union; Inventory control; Economics lot size; Break even analysis; Labour and industrial law; PERT & CMP; Network planning; Marketing; Production management; Swanirvar programme; Case study.

DETAIL DESCRIPTION

Theory :

1 Understand the basic concepts and techniques of decision making.

1.1 Define decision making.

1.2 Discuss the importance and necessity of decision making.

1.3 Discuss different types of decision making.

1.4 Describe the steps in decision making.

1.5 Differentiate between individual decision and group decision.

1.6 Mention the advantages and disadvantages of individual decision.

1.7 Mention advantages and disadvantages of group decision

2 Understand the concept of trade union.

2.1 Define trade union.

2.2 Mention the objectives of trade union.

2.3 Discuss the function of trade union.

2.4 Describe different types of trade union.

2.5 Discuss the causes of weaknesses of trade union in Bangladesh.

2.6 Describe the duties and responsibilities of trade union.

2.7 Mention the names of major trade union in Bangladesh.

3 Understand the concept of inventory control.

3.1 Define inventory.

3.2 Define inventory control.

3.3 Describe the function of inventory control.

3.4 Discuss the necessity and importance of inventory control.

3.5 Mention the advantages and disadvantages of inventory control.

3.6 Explain the following terms :

- Bin card or Bin tag.
- Purchase requisition.
- Store requisition.
- Material transfer note.
- First in first out (FiFo).
- Last in first out(LiFo).

4 Understand the concept of economic lot size.

4.1 Define economic lot size.

4.2 Discuss the effects of over supply and under supply.

4.3 Describe the method of determination of economic lot size.

4.4 Explain the terms :

- Safety stock
- Determination of safety stock

5 Understand the concept of break even analysis.

5.1 Define break even point and break even chart.

5.2 Explain the terms :

- Break even analysis.
- Fixed cost.
- Variable cost.

5.3 Discuss the importance of break even analysis.

5.4 Describe the method of preparing break even chart.

5.5 Describe different methods of break even analysis.

5.6 Draw break even chart in different method.

5.7 Mention the advantages and disadvantages of break even analysis.

6 Understand the concept labour and industrial laws.

6.1 Define labour and industrial law.

6.2 Discuss the importance of labour and industrial law.

6.3 Explain the terms :

- Factory Act.
- Minimum Wage Act (1957).
- Industrial Disputes Act.
- Work Men Compensation Act.
- Trade Union Act.

7 Understand the concept of program evaluation & Review Technique (PERT) and Critical Path Method(CPM).

7.1 Define PERT and CPM.

7.2 Discuss the importance of PERT.

7.3 Discuss the role of CPM in solving management problems.

7.4 Discuss the term t MBO.

8 Understand the concept of network planning.

8.1 Define network.

8.2 Discuss the network planning for CPM.

8.3 Discuss the network planning for PERT.

8.4 Compare among network, PERT and CPM.

9 Understand the concept of marketing.

9.1 Define marketing.

9.2 Discuss the function of marketing.

9.3 State the objectives of marketing.

9.4 Discuss the principles of marketing.

9.5 Explain the terms :

- Brand
- Producer
- Consumer

10 Understand the concept of production management.

10.1 Define production management.

10.2 Discuss the nature of product.

10.3 Discuss the scope or activities of production management.

10.4 Describe the application of management principles of production management.

10.5 Discuss the advantages of applying management process in production.

10.6 Describe the duties and responsibilities of a production manager.

10.7 Describe the history of production management.

11 Understand the concept of swanirvar programme.

11.1 Define swanirvar.

11.2 Discuss the historical background of swanirvar.

11.3 Discuss the characteristics of swanirvar.

11.4 Describe the importance of swanirvar in Bangladesh.

11.5 Discuss the beginning of swanirvar in Bangladesh.

11.6 Describe the swanirvar programme under taken by Bangladesh Government and its progress.

11.7 Discuss the Gram Sarker to achieve in golden goals of swanirvar Programme.

12 Understand the concept of case studies.

12.1 Define case study.
12.2 Discuss the objectives of case study.
12.3 Describe the method of case analysis.
12.4 Discuss the importance of case study.
12.5 Mention the advantages and disadvantages of case study.